

103(a) as being unpatentable over Richardson et al as applied to claim 1 and further in view of the applicants' prior art. Claim 8 is rejected under 35 USC 103(a) as being unpatentable over Richardson et al as applied to claim 1 and further in view of the applicants' prior art and further in view of Zadrozny et al. Applicants respectfully traverse these rejections.

Richardson et al (MindNet) does not teach: "generating a database of inference rules comprising pairs of semantically equivalent paths by associating, in a computer, paths with each other based on a similarity measure between the paths".

The following page shows Table 3 from MindNet, as well as Table 2 from the instant application.

Table 3 in MindNet lists a series of paths connecting pairs of words. The focus here is on how the words are linked. Thus, MindNet has a number of fixed ways to link words. One link is "Means", another is "Hypernym". See Table 1 for the list of fixed links. Each word pair linked by one of the fixed links forms a semrel path. MindNet computes a similarity measure between the words at the end of a semrel path. MindNet uses the paths to compute the word similarity and assigns a weight to the path. The paper describes two methods for computing the weights. One is in the paragraph before Sec 8. Essentially, what

it means is that the paths involving mid-frequency words are weighted high. High frequency words (e.g., 'of', 'and') carry little meaning. Low frequency words are rarely used. The second method is to use a thesaurus and an anti-thesaurus to train. In other words, paths that tend to link the known synonyms in a thesaurus get high weights and paths that tend to link dissimilarity words in the anti-thesaurus get low weights.

The path weights are used to compute word similarity. In the paragraph above MindNet Table 3, they say: "The MindNet similarity procedure is based on the top-ranked (by weight) semrel paths between words." which means that MindNet computes word similarity based on semrel paths. What MindNet cares about is how closely two words are related, so as to decide where in the lexicon they should be placed and what they are related to. Thus, MindNet provides a measure of similarity between two words eg pen and pencil, or between car and truck.

By comparison, the present invention computes the similarity between paths, not between words. This is illustrated by Table 2 shown below. In Table 2, two paths are shown. One path is "X finds a solution for Y" and another is "X solves Y". As can be seen, the words that can fill in the slots X and Y can be quite different in meaning. In fact, the words filling the slots in two paths can be completely unrelated in meaning as Table 2 shows (eg sheriff and committee).

This illustrates that what the instant invention cares about is the similarity between paths, not between words. Thus, in the instant invention, a similarity measure is computed to relate the two paths, as for example how similar "X finds a solution for Y" is to "X solves Y" (where X and Y could be any value).

It can be seen that the link between X and Y could be any semantic relation, and is not fixed like in MindNet. In fact, the instant invention has to do with discovering the semantic relationships between paths. MindNet, by contrast, has a fixed number of semantic relationships (defined in Table 1 of the MindNet reference).

In summary therefore:

MindNet has fixed semantic relations. The present invention as defined by claim 1 requires: "generating a database of inference rules comprising pairs of semantically equivalent paths". Thus, MindNet fixes the relations, while the instant invention discovers them.

MindNet computes the similarity between words, while the instant invention computes similarity between paths.

Nothing in MindNet suggests the approach taken by the applicants. Hence,

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MindNet is irrelevant for all grounds of rejection. The secondary references do not supply the missing teaching.

Table 2. Sample slot fillers for two paths extracted from a newspaper corpus.

<i>"X finds a solution to Y"</i>		<i>"X solves Y"</i>	
<i>SlotX</i>	<i>SlotY</i>	<i>SlotX</i>	<i>SlotY</i>
commission	strike	committee	problem
committee	civil war	clout	crisis
committee	crisis	government	problem
government	crisis	he	mystery
government	problem	she	problem
he	problem	petition	woe
I	situation	researcher	mystery
legislator	budget deficit	resistance	crime
sheriff	dispute	sheriff	murder

The MindNet similarity procedure is based on the top-ranked (by weight) semrel paths between words. For example, some of the top semrel paths in MindNet between *pen* and *pencil*, are shown below:

<i>pen</i> ← Means → <i>draw</i> ← Means → <i>pencil</i>
<i>pen</i> ← Means → <i>write</i> ← Means → <i>pencil</i>
<i>pen</i> ← Hyp → <i>instrument</i> ← Hyp → <i>pencil</i>
<i>pen</i> ← Hyp → <i>write</i> ← Means → <i>pencil</i>
<i>pen</i> ← Means → <i>write</i> ← Hyp → <i>pencil</i>

Table 3. Highly weighted semrel paths between *pen* and *pencil*

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Reconsideration and withdrawal of the rejections, and allowance of the claims,  
is respectfully requested.

/tonylambert#32813/

Anthony R. Lambert  
Agent of Record  
Registration no. 32,813  
Customer no. 020212  
Telephone 780-448-7326